AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Cancelled)

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Cancelled)

11. (Cancelled)

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17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

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28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

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38. (Cancelled)

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)

47. (New) A method of continuously fractionating charged macro-molecules comprising:

loading molecules into a matrix of obstacles;

applying an asymmetric electric field to the matrix to separate the molecules according to size along a horizontal direction of the matrix; and

collecting separated molecules at a plurality of locations along a bottom edge of the matrix,

wherein the step of applying an asymmetric electric field to the matrix comprises applying an electric field which is alternating in direction as a function of time at a location in the matrix, and which has a time average of an electric field vector over many cycles, whereby the time integral of the vector at the same location over a part of the cycles when the electric field is instantaneously pointing to one side of the vector is not spatially symmetric about the vector with the time integral of the vector over another part of the cycles at the same location when the electric field is instantaneously pointing to another side of the vector.

48. (New) The method of claim 47, wherein the step of applying an asymmetric electric field to the matrix comprises applying to the matrix time-dependent electric fields $\vec{E}(t)$ whose odd-order integrals over time, $\int |\vec{E}(t)|^n \vec{E}(t)dt$, are not at the time-average field orientation for every n, where n is any positive even integer.

49. (New) The method of claim 47, wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral of one of the first or second pulses' amplitude over time larger than that of the other pulse;

varying the orientation of the first electric pulse within first and second orientations, and the orientation of the second electric pulse within third and forth orientations.

50. (New) The method of claim 49, wherein the first and second waveforms are square pulses.

51. (New) The method of claim 50, wherein one of the square pulses is of higher amplitude than the other.

52. (New) The method of claim 50, wherein one of the square pulses is of longer duration than the other.

53. (New) The method of claim 47, wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral over time of one of the first or second pulses' amplitudes larger than that of the other pulse; and

applying the first and second electric pulses at first and second fixed orientations.

54. (New) The method of claim 53, wherein the first and second waveforms are square pulses.

55. (New) The method of claim 54 wherein one of the square pulses is of higher amplitude than the other.

56. (New) The method of claim 54, wherein one of the square pulses is of longer duration than the other.

57. (New) The method of claim 47, wherein the charged macro-molecules are deoxyribonucleic acid (DNA).

58. (New) The method of claim 47, wherein the molecules are loaded using electric fields.

59. (New) The method of claim 47, wherein the molecules are extracted from the array of obstacles using electric fields.

60. (New) The method of claim 47, wherein the molecules are routed to the next processing step after fractionation.

61. (New) A method of continuously fractionating charged macro-molecules comprising:

loading molecules into a matrix of obstacles;

applying an asymmetric electric field to the matrix to separate the molecules according to size along a horizontal direction of the matrix; and

collecting separated molecules at a plurality of locations along a bottom edge of the matrix,

wherein the step of applying an asymmetric electric field to the matrix comprises applying to the matrix time-dependent electric fields $\vec{E}(t)$ whose odd-order integrals over time, $\int |\vec{E}(t)|^n \vec{E}(t)dt$, are not at the time-average field orientation for every n, where n is any positive even integer.

62. (New) The method of claim 61, wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral of one of the first or second pulses' amplitude over time larger than that of the other pulse;

varying the orientation of the first electric pulse within first and second orientations, and the orientation of the second electric pulse within third and forth orientations.

63. (New) The method of claim 62, wherein the first and second waveforms are square pulses.

64. (New) The method of claim 63, wherein one of the square pulses is of higher amplitude than the other.

65. (New) The method of claim 63 wherein one of the square pulses is of longer duration than the other.

66. (New) The method of claim 61, wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral over time of one of the first or second pulses' amplitudes larger than that of the other pulse; and

applying the first and second electric pulses at first and second fixed orientations.

67. (New) The method of claim 66, wherein the first and second waveforms are square pulses.

68. (New) The method of claim 67, wherein one of the square pulses is of higher amplitude than the other.

69. (New) The method of claim 67, wherein one of the square pulses is of longer duration than the other.

70. (New) The method of claim 61, wherein the charged macro-molecules are deoxyribonucleic acid (DNA).

71. (New) The method of claim 61, wherein the molecules are loaded using electric fields.

72. (New) The method of claim 61, wherein the molecules are extracted from the array of obstacles using electric fields.

73. (New) The method of claim 61, wherein the molecules are routed to the next processing step after fractionation.

74. (New) A method of continuously fractionating charged macro-molecules comprising:

loading molecules into a matrix of obstacles;

applying an asymmetric electric field to the matrix to separate the molecules according to size along a horizontal direction of the matrix; and

collecting separated molecules at a plurality of locations along a bottom edge of the matrix,

wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral over time of one of the first or second pulses' amplitudes larger than that of the other pulse; and

applying the first and second electric pulses at first and second fixed orientations.

75. (New) The method of claim 74, wherein the step of applying an asymmetric electric field comprises:

alternating first and second electric pulses of first and second waveforms;

maintaining the integral of one of the first or second pulses' amplitude over time larger than that of the other pulse;

varying the orientation of the first electric pulse within first and second orientations, and the orientation of the second electric pulse within third and forth orientations.

76. (New) The method of claim 75, wherein the first and second waveforms are square pulses.

77. (New) The method of claim 76, wherein one of the square pulses is of higher amplitude than the other.

78. (New) The method of claim 76, wherein one of the square pulses is of longer duration than the other.

79. (New) The method of claim 74, wherein the first and second waveforms are square pulses.

80. (New) The method of claim 79, wherein one of the square pulses is of higher amplitude than the other.

81. (New) The method of claim 79, wherein one of the square pulses is of longer duration than the other.

82. (New) The method of claim 74, wherein the charged macro-molecules are deoxyribonucleic acid (DNA).

83. (New) The method of claim 74, wherein the molecules are loaded using electric fields.

84. (New) The method of claim 74, wherein the molecules are extracted from the array of obstacles using electric fields.

85. (New) The method of claim 74, wherein the molecules are routed to the next processing step after fractionation.

86. (New) A method of continuously fractionating charged macro-molecules comprising:

loading molecules into a matrix with an array of obstacles;

applying to the matrix electric fields whose amplitudes are constant in time;

varying field orientations of the electric fields with time to create an asymmetrical electric field to separate the molecules according to size along a horizontal direction of the matrix; and

collecting separated molecules at a plurality of locations along a bottom edge of the matrix,

wherein the step of varying the field orientation with time to create an asymmetrical electric field comprises varying the field orientation with time in such a manner that $\int[\theta(t)]^{n+1}dt$ are not zero for every n, where $\theta(t)$ is field orientation with respect to the time-average field orientation, and n is any even integer larger than zero.

87. (New) The method of claim 86, wherein the fields alternate between two fixed orientations.

88. (New) The method of claim 86, wherein the charged macro-molecules are deoxyribonucleic acid (DNA).

89. (New) The method of claim 86, wherein the molecules are loaded using electric fields.

90. (New) The method of claim 86, wherein the molecules are extracted from the array of obstacles using electric fields.

91. (New) The method of claim 86, wherein the molecules are routed to the next processing step after fractionation.

Please cancel claims 1-46.